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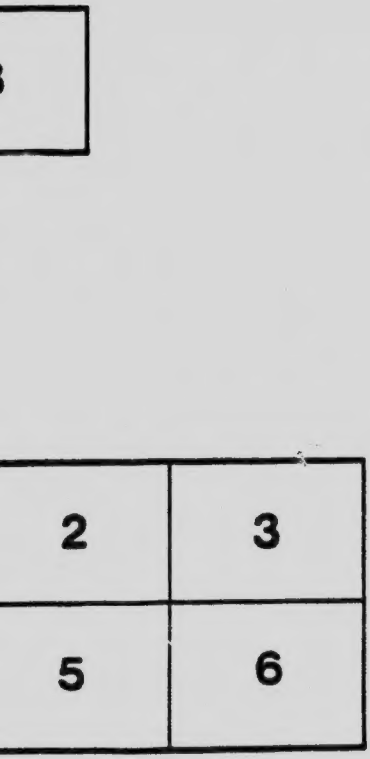

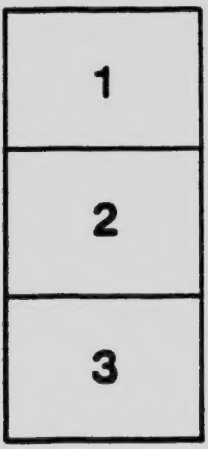

Circular Bulletin No. 1.

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PROVINCE OF BRITISH COLUMBIA.

DEPARTMENT OF AGRICULTURE (LIVE STOCK BRANCH).

The Use of Agricultural Lime in British Columbia.

By W. Newton, Soil and Crop Instructor.

A LARGE PROPORTION of the soils of British Columbia are in need of lime. Although mainly applied to sweeten sour or acid soils, lime has three other important uses—it improves the texture of soils, especially heavy clays, it makes plant-food in the soil more available to crops, and it is a plant-food. The benefit of liming is seldom a result of the last-mentioned use, for most soils contain enough lime as a plant-food.

CORRECTING ACIDITY.

Soil-acidity is detrimental to fertility in several respects. Most important is that acidity tends to check the growth of alfalfa, clover, and other most valuable leguminous plants. It is the lack of lime in many sections of this Province that prevents the successful culture of alfalfa. The difficulty that is being experienced in some of the older sections in getting a "catch" of common red clover is also probably due to a lack of lime. New lands are inclined to be acid and are benefited by an application of lime, although common red clover seems to do well on them for a number of years in spite of the acid. The accumulation of acid in peaty soils very often makes them unproductive until this acid is neutralized by the application of lime.

HOW TO DETECT SOIL-ACIDITY.

A very simple and reliable method to detect soil-acidity is by the use of blue litmus-paper. Secure some of this paper from a druggist, and when the soil is moist from rain make a slit in it with a clean knife. Insert a strip of blue litmus-paper and close the soil for fully five minutes. If the paper becomes dotted with pink spots or becomes entirely pink, the soil is acid. The test can also be made as follows: Take a handful of the soil and form a ball. Break the ball in half and put the paper between. Dry soil can be tested in the same manner by wetting with soft water, preferably rain-water. Always allow fully five minutes to elapse before examining the blue litmus-paper. Soil-acidity is very often indicated with great clearness by the growth of certain weeds, such as sheep-sorrel or sour-grass (*Rumex acetosella*), horsetail rush (*Equisetum arvense*), corn-spurry (*Spergula arvensis*), and wood horsetail (*Equisetum sylvaticum*). Fields which have become acid, unless kept entirely free from weeds by very thorough cultivation, usually become infested with these weeds. They are found in soils containing plenty of lime, but on such soils they are seldom troublesome, being easily eradicated by the ordinary methods of cultivation. They are acid-loving plants and are difficult to control when the soil is lacking in lime. The farmer should always investigate the condition of his soil when these plants infest his fields. The failure of alfalfa and clovers would lead one to suspect acidity in the soil.

FORMS OF LIME.

Agricultural lime may be purchased in various forms. It may be purchased as quicklime, known also as stone lime, lump lime, burned lime, unslaked lime, and by other names. It is well to remember that in the familiar process of "slaking" with water the increased weight is as follows: If we consider the weight of quicklime as 56 lb., when it is completely slaked there would be 74 lb. of "slaked" or "hydrated lime," providing no surplus water was added. If the same 56 lb. of quicklime is exposed to the air until it is completely air-slaked, the weight would increase to 100 lb. The values in the table which follows are based on the above. In a great many places it is found that ground limestone rock is the most economical form of lime to use for agricultural purposes. It has the same chemical composition as air-slaked lime, but air-slaked lime will usually give quicker results on account of being in a finer state of division.

COMPARATIVE VALUES.

In purchasing lime it is necessary to know the comparative values. The following gives a comparison based on the amount of calcium (weights having approximately the same value):—

Quicklime.	Water-slaked or Hydrated Lime.	Ground Limestone Rock.
1,000 lb.	1,320 lb.	1,800 lb.
2,000 "	2,640 "	3,600 "
	Comparative Values per Ton.	
$3.60	$2.70	$2.00
5.35	4.05	3.00

THE FORMS OF LIME AND HOW TO APPLY.

Quicklime.—Quicklime is purchased in hard lumps and consequently is not suitable for applying uniformly over the fields. It must be slaked. This is conveniently done by placing in small heaps uniformly disposed over the field and covering with soil. If the weather and soil is damp the lime will absorb enough moisture to slake, but it is usually a good plan to throw a small amount of water over the piles before covering over with earth. It should remain in the pile two or three weeks to become thoroughly slaked. As high as 2,000 lb. can be applied to clay, but it is seldom wise to apply more than 1,000 lb. to the lighter sandy soils. Freshly slaked lime is caustic in its effect. For this reason it is always wise to apply in the fall. This form of lime applied in large quantities is apt to hasten unduly the decomposition of the vegetable matter in the soil. Where there is a surplus of vegetable matter, as in peaty soils, this result is beneficial, for much plant-food is released. Ground limestone or thoroughly air-slaked lime is always safer to apply.

Ground Limestone.—Besides composition, fineness is an essential if good results are to be obtained from its use. The analysis of samples of limestone from various points in this Province would indicate that there are plenty of sources where satisfactory deposits of limestone are to be found. Where quick, prompt action is desired, 75 per cent. should pass through a 100-mesh sieve. A coarse material 50 to 75 per cent. of which will pass through a 50-mesh sieve will be quite satisfactory; such material, however, is slower acting. Larger applications of such material would be necessary. Ground limestone is not caustic and will not injure a growing crop or sprouting seeds.

Special machinery is now manufactured to pulverize limestone. It is a mistake to expect a jaw-crusher to do the work of a grinder. The hammer principle should be sought when any pulverizing has to be done. The moisture in the stone causes the fine material to pack between the jaws and breakage of the machine results.

SUGGESTIONS REGARDING APPLICATION.

Any form of lime should be applied to the surface, for the tendency of all lime compounds is to sink. It must be thoroughly incorporated with the soil by disking or harrowing. Lime can be applied broadcast from a wagon with a shovel, but it is more easily applied with a fertilizer attachment or a fertilizer drill. Many "home-made" machines are in use that are cheaper, more satisfactory, and more durable than anything on the market. In hauling and spreading lime it is of first importance to save time and labour. As a rule, it is usually far more economical to purchase in bulk and have it shipped on box cars. Wetting will do no harm except to give trouble in spreading. Handling in bags is expensive and the bags are easily damaged. If tight wagon-boxes are procurable the bags are wholly unnecessary. If bags must be used, bag it at the car when hauling. To save time, haul direct from the car to the field. Transfer there to the spreader and spread at once on the land.

Sometimes lime is applied with the manure-spreader. The spreader is set at its lowest gear and a few inches of fine manure is spread over the bottom to hold the lime in. The lime must be spread evenly on top of this thin layer of manure.

LIMING SOMETIMES INJURIOUS.

Excessive amounts of lime, especially on light sandy soils, may be injurious. It hastens the decomposition of the vegetable matter unduly. The result is that you have a soil depleted in humus which is neither retentive of moisture or of fertilizing elements applied. This is particularly true when freshly water-slaked lime is used.

There is an old adage that lime "makes the fathers rich and the sons poor." If lime is used alone it acts as a soil stimulant. That is, it tends to liberate potash, nitrogen, and sometimes phosphoric acid, the important elements of fertility in soils. The extra drain of the increased crops, due to the liberation of the plant-food in the soil, will leave the soil finally in a worse condition than at the outset. The use of lime does not do away with the necessity of using barnyard manure and commercial fertilizer.

HOW OFTEN SHOULD LIMING BE PRACTISED?

The frequency and quantities of lime to apply in order to keep up maximum yields depends very largely on the character of the soil. Under average conditions, one ton of pulverized limestone once every four years ought to be sufficient. Every crop leaves a certain quantity of acid in the soil that must be neutralized. There is also [illegible] considerable loss of lime by leaching that must be replaced. The first ap[illegible]ld be heavy. Two tons per acre at least should be applied. When the [illegible] to need lime, it is a waste of time, money, and energy to continue to [illegible] this need has been supplied; for the economic use of all fertilizing m[illegible]cluding manure, depends upon the lime-supply.

GYPSUM OR LAND PLASTER.

Gypsum or land-plaster will not correct the acidity of soils, and therefore cannot take the place of lime.

SUMMARY.

(1.) A large proportion of the soils of British Columbia need lime.

(2.) The lack of lime is checking the successful culture of clover and alfalfa, particularly the latter.

(3.) The need of lime can be detected by any person by using the blue-litmus test. Sheep-sorrel or sour-grass and horsetail rush, when troublesome as weeds, indicate the necessity of liming.

(4.) Ground limestone can probably be more cheaply procured and handled than any other form.

(5.) Lime should be top-dressed. It should not be ploughed in.

(6.) Barnyard manure or commercial fertilizers are necessary in addition to lime to keep up the fertility of soils.

(7.) For the economic use of all fertilizers, including barnyard manure, lime is necessary.

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British Columbia Dairymen's Report.
Second International Egg-laying Contest at Victoria, B.C.
Fifteenth Annual Report, Farmers' Institutes of British Columbia.
Report of Department of Agriculture, Years 1913-14.

Miscellaneous.

Stock-breeders' Directory.
British Columbia Poultry-breeders' Directory.

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